ABSTRACT

The present invention provides an apparatus and method for a new class of micro-machined electromechanical devices that make use of vibrating membranes. The electromechanical devices include two or more electrodes which are positioned with a membrane. A gap exists between the membrane and each electrode which may vary for each electrode. In general, one electrode is used as an input electrode which receives an electrical signal that causes vibration of the membrane. The vibration of the membrane is then coupled to a receiving or an output electrode. A DC bias voltage is applied to the electrodes to set or modify a width of a gap in the electromechanical device. The electromechanical device could be designed as a transformer, a capacitor, a resonator or a filter. In addition, the device includes a control voltage to dynamically change the coupling between the input electrode and the output electrode(s).